



# HS Riudellots de la Selva Viaduct

Riudellots, Spain / 2009

Structural type  
Characteristics  
Client  
Scope

lateral steel trusses supporting a steel deck  
main span 53.0m  
Project: PROINTEC / Technical support: ACCIONA  
detailed design and construction support



The structure consists of a single two span deck of 53.0m + 53.0m between axes giving a total length of 106.0m. The structure has a marked skew and therefore the axis supports on the piers and abutments offer an angle of 34.3° on the high speed train line. The width of the deck is a constant 15.70m.

The structure consists of two longitudinal steel truss girders, with the upper chord parabolically arranged on the extremes of the transversal cross-section and separated at a distance of 14.40m between axes. The rise of the parabola at the centre of each span is 7.60m between the upper and lower chord axes. Continuity is given to the upper chords between one span and another employing a counter parabola over the pier supports which are placed 15.0m on each side of the piers and with a depth of 4.30m on supports between continuity and lower chords.

The deck between the longitudinal girders is formed by a hollow reinforced concrete slab between the lower chords of the truss girders which is placed on HEB-600 steel profiles set every 1.0m. The slab depth goes from 0.60m at the lower chords to 0.73 in the centre; hence the upper face of the slab has a 2% camber from its centre to the truss. The slab is cast over lost formwork composed of corrugated steel sheeting supported on HEB steel profiles.

To appease the horizontal loads the bridge will include longitudinal STU devices. Four devices shall be placed in each abutment (separation of 1.80m between axes) and oriented in the axis direction of the structure. These devices are able to block against sudden loads (brake and seismic), so impeding movement but oppose displacement due to slow loads such as those caused by rheological and thermal movements.

The supports on the piers are hoop-wrapped bearings and on the abutments, pot bearings, which are arranged in the longitudinal sense and fixed transversally. The piers are reinforced concrete with a hexagonal-shaped shaft set on a 1.80m x 1.90m rectangle 8.80m in height. They are founded on 6.25m x 10.0m x 1.90m footings set on six 1.25m diameter piles.

The abutments are closed so as to contain the access embankment to the structure and not to invade the motorway area; to do this it is necessary to place a 23.5m long surrounding wall on the right-hand side of abutment 1 due to the heavy skew of the structure. Also, the shape on plan is somewhat unusual as the low walls have to adapt to the orthogonal jointing drawn below the tracks which is rather disjointed. The foundation is fulfilled employing twenty-five 18.0m deep piles placed under a 2.0m deep pile-cap which takes on an irregular form on plan.



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